What determines the size of magnetospheric substorms?

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This paper addresses the long-standing question of what parameter in the solar wind best describes the intensity of magnetospheric substorms. There is a general relationship between an integrated (over 30-60 min.) value of southward interplanetary magnetic field (IMF) and the magnitude of a substorm that follows the southward IMF, although individual substorms deviate considerably from this average relationship. The probability of substorm occurrence as well as the latitude of substorm initiation are also controlled by the southward IMF. Assuming that the substorm intensity can be monitored by the total current of the westward auroral electrojet in the midnight sector, i.e., how deep the horizontal component will decrease at high latitudes, this paper summarizes the possible factors to generate a variety of substorms with a wide dynamic range in the energy that is released during substorms for a given input from the solar wind. It is even contended that there is a possibility that what we are observing in the near-earth environment is a very small fraction of the total energy, resulting from random processes in the magnetosphere-ionosphere system, so that it may be basically impractical to attempt to find a quantity observed on the earth's surface that best correlates with solar wind parameters.